CLAIMS

What is claimed is:

1. A radio frequency ("RF") power amplifier with high output efficiency operating in a switched mode at a predetermined frequency band, said amplifier comprising:

a semiconductor device having a control terminal and two conducting terminals, said semiconductor device capable of a conductive state and a nonconductive state, wherein said control terminal controls the conductance across said two conducting terminals, wherein a first of said two conducting terminals is tied to ground potential, wherein a second of said two conducting terminals comprises the output of said amplifier;

a RF source coupled to said control terminal of said semiconductor device;

a resonant inductor circuit coupled to said second of said two conducting terminals, said resonant inductor circuit for eliminating the capacitance between said two conducting terminals when said semiconductor device is in said nonconductive state; and

a filter coupled to said second of said two conducting terminals for providing controlled impedance to signals outside of said predetermined frequency band.

2. The RF power amplifier of claim 1 wherein said RF source is a sinusoidal wave.

3. The RF power amplifier of claim 1 wherein said RF source is a rectangular wave.

4. The RF amplifier of claim 1 wherein said RF source is a square wave.

5. The RF power amplifier of claim 1 wherein said semiconductor device is a field effect transistor.

6. The RF amplifier of claim 4 wherein said field effect transistor is a metal oxide silicon field effect transistor.

7. The RF amplifier of claim 1 wherein said semiconductor device is a bipolar transistor.

8. The RF amplifier of claim 6 wherein said bipolar transistor is an insulated gate bipolar transistor.

9. The RF amplifier of claim 1 wherein said semiconductor device is a plurality of discrete transistors arranged in a parallel configuration sharing said RF source.

10. The RF amplifier of claim 9 wherein said plurality of discrete transistors are arranged in a kilowatt power transistor configuration.

11. The RF amplifier of claim 1 wherein said filter comprises:

a first lowpass filter for degenerating sub-harmonics of said predetermined frequency band; and

a second lowpass filter for degenerating baseband frequencies.

12. The RF power amplifier of claim 1 wherein said resonant inductor circuit comprises:

an inductor; and

a DC voltage source coupled to said inductor.

13. The RF power amplifier of claim 1 wherein said resonant inductor circuit modifies the load impedance of said seminoductor device in said conductive state.

14. The RF power amplifier of claim 1 further comprising:

a second filter coupled to said second conducting terminal via said resonant inductor circuit wherein the level of said output of said amplifier is approximately at RF ground potential and wherein the level of said output of said amplifier is not affected by said second filter.

15. The RF amplifier of claim 14 wherein said second filter provides controlled impedance for baseband frequency signals.

16. The RF amplifier of claim 15 wherein said RF source is stable into all voltage standing wave ratio ("VSWR") load conditions over the dynamic range of output power.

17. The RF amplifier of claim 1 wherein said RF source is a low voltage MOSFET transistor operating in a switch mode.

18. The RF amplifier of claim 17 wherein said low voltage MOSFET employs broadband RF feedback from the drain to the gate terminal and wherein said low voltage MOSFET employs baseband frequency.

19. The RF amplifier of claim 1 wherein the output of said RF source is fixed.

20. The RF amplifier of claim 1 wherein the output of said RF source is varied.

21. A radio frequency ("RF") power amplifier with high output efficiency operating in a switched mode at a predetermined frequency band, said amplifier comprising:

a discrete transistor having a gate terminal, a source terminal, and a drain terminal, said drain terminal in a grounded configuration, said source terminal comprising the output of said amplifier;

a RF source coupled to said gate terminal of said discrete transistor;

a resonant inductor circuit coupled to said source terminal for eliminating the capacitance between said drain terminal and said source terminal when said discrete transistor is in an off state; and

a filter coupled to said source terminal for filtering out signals outside of said predetermined frequency band.

22. The RF power amplifier of claim 21 wherein said RF source is a sinusoidal wave.

23. The RF power amplifier of claim 21 wherein said RF source is a square wave

24. The RF power amplifier of claim 21 wherein said RF source is a rectangular wave.

25. The RF power amplifier of claim 21 wherein said resonant inductor circuit comprises:

an inductor; and

a DC voltage source coupled to said inductor.

26. The RF amplifier of claim 21 wherein said discrete transistor is a field effect transistor.

27. The RF amplifier of claim 21 wherein said discrete transistor is a metal oxide silicon field effect transistor.

28. The RF amplifier of claim 21 wherein said discrete transistor is a bipolar transistor.

29. The RF amplifier of claim 21 wherein a plurality of said discrete transistors are arranged in a parallel configuration sharing said RF source.

30. The RF amplifier of claim 29 wherein said plurality of said discrete transistors are arranged in a kilowatt power transistor configuration.

31. The RF power amplifier of claim 21 wherein said resonant inductor circuit modifies the load impedance of said discrete transistor in said conductive state.

32. The RF power amplifier of claim 21 further comprising:

a second filter coupled to said source terminal via said resonant inductor circuit wherein the level of said output of said amplifier is approximately at RF ground potential and wherein the level of said output of said amplifier is not affected by said second filter.

33. The RF amplifier of claim 32 wherein said second filter provides controlled impedance for baseband frequency signals.

34. A radio frequency ("RF") power amplifier with high output efficiency operating in a switched mode at a predetermined frequency band, said amplifier comprising:

a discrete transistor having a gate terminal, a source terminal, and a drain terminal, said source terminal in a grounded configuration, said drain terminal comprising the output of said amplifier;

a RF source coupled to said gate terminal of said discrete transistor;

a resonant inductor circuit coupled to said drain terminal for eliminating the capacitance between said drain terminal and said source terminal when said discrete transistor is in an off state; and

a filter coupled to said drain terminal for filtering out signals outside of said predetermined frequency band.

35. The RF power amplifier of claim 34 wherein said RF source is a sinusoidal wave.

36. The RF power amplifier of claim 34 wherein said RF source is a square wave

37. The RF power amplifier of claim 34 wherein said RF source is a rectangular wave.

38. The RF power amplifier of claim 34 wherein said resonant inductor circuit comprises:

an inductor; and

a DC voltage source coupled to said inductor.

39. The RF amplifier of claim 34 wherein said discrete transistor is a field effect transistor.

40. The RF amplifier of claim 39 wherein said discrete transistor is a metal oxide silicon field effect transistor.

41. The RF amplifier of claim 34 wherein said discrete transistor is a bipolar transistor.

42. The RF amplifier of claim 34 wherein a plurality of said discrete transistors are arranged in a parallel configuration sharing said RF source.

43. The RF amplifier of claim 42 wherein said plurality of said discrete transistors are arranged in a kilowatt power transistor configuration.

44. The RF power amplifier of claim 34 wherein said resonant inductor circuit modifies the load impedance of said discrete transistor in said conductive state.

45. The RF power amplifier of claim 34 further comprising:

a second filter coupled to said drain terminal via said resonant inductor circuit wherein the level of said output of said amplifier is approximately at RF ground potential and wherein the level of said output of said amplifier is not affected by said second filter.

46. The RF amplifier of claim 34 wherein said second filter provides controlled impedance for baseband frequency signals.